

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER 01013.0004.US00
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (if known) <b>10/009484</b>
		PRIORITY DATE CLAIMED 14 <sup>th</sup> June 1999
INTERNATIONAL APPLICATION NO. PCT/CH00/00319	INTERNATIONAL FILING DATE 9 <sup>th</sup> June 2000	
TITLE OF INVENTION Selection of Information Units for Mobile Client Computers		
APPLICANT(S) FOR DO/EO/US Andreas FABRI		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
<ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>3. <input type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</li> <li>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</li> <li>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</li> <li>b. <input checked="" type="checkbox"/> has been communicated by the International Bureau.</li> <li>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li>6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> is attached hereto.</li> <li>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</li> </ol> </li> <li>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)). <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</li> <li>b. <input type="checkbox"/> have been communicated by the International Bureau.</li> <li>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li>d. <input checked="" type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li>9. <input type="checkbox"/> An Oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</li> <li>10. <input checked="" type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol> <p><b>Items 11 to 20 below concern document(s) or information included:</b></p> <ol style="list-style-type: none"> <li>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</li> <li>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 36 CFR 3.28 and 3.31 is included.</li> <li>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment.</li> <li>14. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</li> <li>15. <input type="checkbox"/> A substitute specification.</li> <li>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.</li> <li>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</li> <li>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</li> <li>20. <input type="checkbox"/> Other items or information.</li> </ol>		

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)		INTERNATIONAL APPLICATION NO.		ATTORNEY'S DOCKET NO.	
10/009484		PCT/CH00/00319		01013.0004.US00	
21. <input checked="" type="checkbox"/> The following fees are submitted:				CALCULATIONS PTO USE ONLY	
<b>BASIC NATIONAL FEE (37 CFR 1.492 (A) (1) – (5))</b>				\$	
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO .....				1000.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .....				860.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2) paid to USPTO.....				710.00	
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33 (1)-(4) .....				690.00	
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims satisfied provisions of PCT Article 33 (1)-(4) .....				100.00	
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				\$860	
Surcharge of \$130.00 for furnishing the Oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(c)).				\$	
<b>CLAIMS</b>	<b>NUMBER FILED</b>	<b>NUMBER EXTRA</b>	<b>RATE</b>	<b>\$</b>	
Total claims	21 - 20 =	1	X \$ 18.00	\$18	
Independent claims	3 - 3 =	0	X \$ 80.00	\$ 0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			X \$270.00	\$ 0	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$ 18	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$	
<b>SUBTOTAL =</b>				\$878	
Processing fee of \$130.00 for furnishing the Oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
<b>TOTAL NATIONAL FEE =</b>				\$	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$	
<b>TOTAL FEES ENCLOSED =</b>				\$878	
				<b>Amount to be refunded:</b>	\$
				<b>charged:</b>	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$878 to cover the above fees is enclosed.					
b. <input type="checkbox"/> Please charge my Deposit Account No. 08-3038 referencing Order No. _____ in the amount of \$ _____ to cover the above fees.					
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 08-3038 referencing Order No. _____. A duplicate copy of this sheet is enclosed.					
d. <input type="checkbox"/> Fees are to be charged to a credit card. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.					
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37                  CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.</b>					
SEND ALL CORRESPONDENCE TO:		SIGNATURE: <u>Michael Bell</u> NAME: <u>Michael Bell</u> REGISTRATION NUMBER: <u>Reg. No. 39,604</u>			

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Andreas FABRI

Serial No: To be Assigned  
(Based on International Appln. No.  
PCT/CH00/00319)

Filing Date: Herewith

International Filing Date: 9 June 2000

Title: SELECTION OF INFORMATION UNITS  
FOR MOBILE CLIENT COMPUTERS

Group Art Unit: To be Assigned

Examiner: To be Assigned

Atty. Dkt. No.: 01013.0004.US00

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Before undertaking the examination of the above noted application, Applicant requests the following:

**AMENDMENTS:****IN THE CLAIMS:**

Please amend claims 1-21 as rewritten below. A copy of the amended claims is attached, marked up to show the changes relative to the previous version of the claims.

1. [amended] A facility for selecting information units for a mobile client computer, comprising a server computer having means for selecting information units by preset criteria, wherein the preset criteria comprise geographical locational information in the form of a geographical longitude and latitude,

each information unit has geographical locational information in the form of a geographical longitude and latitude assigned to it, and

the locational information and a geographical position for the client computer, in the form of a geographical longitude and latitude, are input variables for the selecting means.

2. [amended] The facility according to claim 1, wherein the server computer has data structures for supporting a selection made from among preset points on a plane which are situated closest to a further preset point.
3. [amended] The facility according to claim 2, wherein the data structure maps a Voronoi diagram.
4. [amended] The facility according to claim 2, wherein the data structure maps a two-dimensional range tree.
5. [amended] The facility according to claim 1, wherein the information units [contain essentially] comprise images from web cameras.
6. [amended] The facility according to claim 1, wherein the information units can be transmitted to a client computer and contain instructions for showing the information units on a display unit belonging to the client computer .
7. [amended] The facility according to claim 1, wherein the position used for the client computer is a current, past, or expected future position of the client computer .
8. [amended] The facility according to claim 1, wherein the information units [have] comprise references to sources of information .
9. [amended] A computer system for selecting information units for mobile client computers, comprising a server computer having means for selecting information units by preset criteria, and a client computer, wherein

the preset criteria comprise geographical locational information in the form of a geographical longitude and latitude,

each information unit has geographical locational information in the form of a geographical longitude and latitude assigned to it, and

the locational information and a position for the client computer, in the form of a geographical longitude and latitude, can be used for the selection.

10. [amended] The computer system according to claim 9, wherein the client computer has means for determining its geographical location.

11. [amended] The computer system according to claim 9, wherein the client computer is fitted in a means of transport .

12. [amended] The computer system according to claim 11, wherein the means of transport is a train, aircraft, motor car, boat, bicycle, airship, submarine or spacecraft.

13. [amended] The computer system according to claim 9, wherein the means of transport has a proxy computer.

14. [amended] The computer system according to claim 9, wherein the server computer and the client computer are connected together via a communications network comprising a wireless communications link.

15. [amended] A method of selecting information units for mobile client computers, wherein each information unit has assigned to it geographical locational information in the form of a geographical longitude and latitude and this geographical locational information and a position for the client computer in the form of a geographical longitude and latitude are used for the selection.

16. [amended] The method according to claim 15, wherein the position used for the client computer is a current, past, or expected future position of the client computer .

17. [amended] The method according to claim 15, wherein the geographical locational information of each information unit assigns a physical position to the information unit [a physical position], and the selection determines a preset number of information units whose assigned position is closest to the position of the client computer .

18. [amended] The method according to claim 15, wherein the geographical locational information of each information unit assigns a physical position to the information unit, and the selection determines those information units whose assigned positions are within a predetermined area surrounding the position of the client computer .

19. [amended] The method according to claim 15, wherein the server computer determines categories of interest by interaction with a user, and restricts the selection to information units which belong to the categories of interest.

20. [amended] The method according to claim 15, wherein the server computer transmits results of the selection to the client computer and the client computer shows the results on a display unit belonging to the client computer .

21. [amended] The method according to claim 15, wherein the information units contain image data which is generated by web cameras.

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**REMARKS:**

**AMENDMENTS TO THE CLAIMS:**

The amendments to the claims have been made to delete reference numbers, correct grammatical errors, incorporate amendments made during international preliminary examination, and to ensure that the scope and language of the claims is more precise and clear in defining what the Applicant considers to be his invention.

Applicant respectfully submits that no new matter is introduced by the proposed amendments. Support for the above amendments to the claims can be found in the original specification as filed in the following locations:

Amendment to Claim:

1, 9 and 15

Disclosure in Specification Supporting Amendment:

Page 6, lines 20-30 of the translation of the specification.

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Applicant requests any extension of time that may be deemed necessary to further the prosecution of this application. Applicant's representative authorizes the Commissioner to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 01-2508, referencing Order No.

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In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner is respectfully requested to directly contact the undersigned by telephone at the number given below.

Respectfully submitted,

David P. Owen  
Patent Attorney

Reg. No. 43,344

Tel. 44 20 7628 3303

(Please note: this is telephone no. in London, United Kingdom)

Date: 12/13/01

## Marked Up Copy of Amended Claims Showing Additions and Deletions

1. [amended] [Facility] A facility for selecting information units for a mobile client computer [(4)], comprising a server computer [(3)] having means for selecting information units by preset criteria, [characterised in that] wherein

the preset criteria [have] comprise geographical locational information in the form of a geographical longitude and latitude,

each information unit has geographical locational information in the form of a geographical longitude and latitude assigned to it, and

[this] the locational information and a geographical position for the client computer [(4)], in the form of a geographical longitude and latitude, are input variables for the selecting means.

2. [amended] [Facility] The facility according to claim 1, [characterised in that] wherein the server computer [(3)] has data structures for supporting a selection made from among preset points on a plane which are situated closest to a further preset point.

3. [amended] [Facility] The facility according to claim 2, [characterised in that] wherein the data structure maps a Voronoi diagram.

4. [amended] [Facility] The facility according to claim 2, [characterised in that] wherein the data structure maps a two-dimensional range tree.

5. [amended] [Facility] The facility according to claim 1, [characterised in that] wherein the information units [contain essentially] comprise images from web cameras.

6. [amended] [Facility] The facility according to claim 1, [characterised in that] wherein the information units can be transmitted to a client computer [(4)] and contain instructions for showing the information units on a display unit belonging to the client computer [(4)].

7. [amended] [Facility] The facility according to claim 1, [characterised in that] wherein the position used for the client computer [(4)] is a current, past, or expected future position of the client computer [(4)].



8. [amended] [Facility] The facility according to claim 1, [characterised in that] wherein the information units [have] comprise references to sources of information [(2)].

9. [amended] [Computer] A computer system for selecting information units for mobile client computers [(4)], comprising a server computer [(3)] having means for selecting information units by preset criteria, and a client computer [(4)], [characterised in that] wherein

the preset criteria [have] comprise geographical locational information in the form of a geographical longitude and latitude,

each information unit has geographical locational information in the form of a geographical longitude and latitude assigned to it, and

[this] the locational information and a position for the client computer [(4)], in the form of a geographical longitude and latitude, can be used for the selection.

10. [amended] [Computer] The computer system according to claim 9, [characterised in that] wherein the client computer [(4)] has means for determining its geographical location.

11. [amended] [Computer] The computer system according to claim 9, [characterised in that] wherein the client computer [(4)] is fitted in a means of transport [(9)].

12. [amended] [Computer] The computer system according to claim 11, [characterised in that] wherein the means of transport [(9)] is a train, aircraft, motor car, boat, bicycle, airship, submarine or spacecraft.

13. [amended] [Computer] The computer system according to claim 9, [characterised in that] wherein the means of transport [(9)] has a proxy computer [(8)].

14. [amended] [Computer] The computer system according to claim 9, [characterised in that] wherein the server computer [(3)] and the client computer [(4)] are connected together via a communications network [(1), the client computer (4) preferably having] comprising a wireless communications link [to the communications network (1)].

15. [amended] [Method] A method of selecting information units for mobile client computers [(4)], [characterised in that] wherein each information unit has assigned to it geographical

locational information in the form of a geographical longitude and latitude and this geographical locational information and a position for the client computer [(4)] in the form of a geographical longitude and latitude are used for the selection.

16. [amended] [Method] The method according to claim 15, [characterised in that] wherein the position used for the client computer [(4)] is a current, past, or expected future position of the client computer [(4)].

17. [amended] [Method] The method according to claim 15, [characterised in that] wherein the geographical locational information of each information unit assigns a physical position to [said] the information unit [a physical position], and the selection determines a preset number of information units whose assigned position is closest to the position of the client computer [(4)].

18. [amended] [Method] The method according to claim 15, [characterised in that] wherein the geographical locational information of each information unit assigns a physical position to [said] the information unit [a physical position], and the selection determines those information units whose assigned positions are [in an] within a predetermined area surrounding the position of the client computer [(4)].

19. [amended] [Method] The method according to claim 15, [characterised in that] wherein the server computer [(3)] determines categories of interest by interaction with a user, and restricts the selection to information units which belong to [said] the categories of interest.

20. [amended] [Method] The method according to claim 15, [characterised in that] wherein the server computer [(3)] transmits results of the selection to the client computer [(4)] and the client computer [(4)] shows the results on a display unit belonging to the client computer [(4)].

21. [amended] [Method] The method according to claim 15, [characterised in that] wherein the information units contain image data which is generated by [so-called] web cameras [or "webcams"].

Translator's note: Claim 1, line 8 - 'the preset criteria have geographical locational information'.

The German word used here is "aufweisen" which is indicative of possession in the most general sense. However, the English is more comprehensible if "have" in this very general sense is understood as "include" (= "comprise").

C L A I M S

1. Facility for selecting information units for a mobile client computer (4), comprising a server computer (3) having means for selecting information units by preset criteria, characterised in that, the preset criteria have geographical locational information in the form of a geographical longitude and latitude, each information unit has geographical locational information in the form of a geographical longitude and latitude assigned to it, and this locational information and a geographical position for the client computer (4), in the form of a geographical longitude and latitude, are input variables for the selecting means.

9. Computer system for selecting information units for mobile client computers (4), comprising a server computer (3) having means for selecting information units by preset criteria, and a client computer (4), characterised in that, the preset criteria have geographical locational information in the form of a geographical longitude and latitude, each information unit has geographical locational information in the form of a geographical longitude and latitude assigned to it, and this locational information and a position for the client computer (4), in the form of a geographical longitude and latitude, can be used for the selection.

15. Method of selecting information units for mobile client computers (4), characterised in that each information unit has assigned to it geographical locational information in the form of a geographical longitude and latitude and this geographical locational information and a position for the client computer (4) in the form of a geographical longitude and latitude are used for the selection in a server computer (3).

*Amendments*

for the files and information which are relevant to the user to be found.

It is also a generally familiar idea for motor cars or aircraft seats to be fitted with client computers provided with HTML browsers to allow information from the internet to be displayed. In these applications too there is the problem described above of the user being swamped with information.

In EP 0 785 535 A1 is described a vehicle navigation system in which a map section stored on a CD-ROM in the client is determined from GPS positioning information. On the basis of a district of a town selected by a user, the name of the district is transmitted to the server, whereupon the latter determines from the district information units assigned to, for example, entertainment offerings. It is not however possible in this way for suitable information units to be selected automatically and without any interaction with a user.

Description of the invention

The object of the invention is therefore to provide a facility, a computer system and a method for selecting information units for mobile client computers, of the above-mentioned kind, which reduce the amount of information which is presented to a user and which increase the relevance to the user of the information units selected.

This object is achieved by a facility, a computer system and a method for selecting information units which have the features detailed in claims 1, 9 and 15.

- 2a -

*Amendments*

Hence, in the method according to the invention the selection of information units for mobile client computers is effected by assigning geographical locational information in the form of a geographical longitude and latitude to each of  
5 the individual information units and by making allowance for this locational information and the geographical position of the client computer in the form of a geographical longitude and latitude in making the selection.

10 In this way it becomes possible to restrict the selection of information units to those units which relate to a given geographical area. In particular, information units which are situated close to the position of the client computer can be selected.

Selection of information units for mobile client computers

DESCRIPTION

5

Technical field

The invention relates to the field of communications technology. It relates to a facility, a computer system and a  
10 method for selecting information units for mobile client computers, as detailed in the preambles to claims 1, 9 and 15.

Prior art

15 A method of this kind is known from US 5,659,732 for example. In it, information units on a communications network, such as HTML files for example, which can be read over the internet, are indexed by a so-called search engine. In response to a search query containing one or more query terms from a  
20 user, files which are being looked for are identified from an index. The user is presented with a suitably prepared list of the files found and their addresses, in the form of URL's (uniform resource locators) for example. Because of the vast number of files that can be accessed on the internet, the number  
25 of files found is often very large. This makes it more difficult for the files and information which are relevant to the user to be found.

It is also a generally familiar idea for motor cars or aircraft seats to be fitted with client computers provided with  
30 HTML browsers to allow information from the internet to be displayed. In these applications too there is the problem described above of the user being swamped with information.

## Description of the invention

The object of the invention is therefore to provide a facility, a computer system and a method for selecting  
5 information units for mobile client computers, of the above-mentioned kind, which reduce the amount of information which is presented to a user and which increase the relevance to the user of the information units selected.

This object is achieved by a facility, a computer system  
10 and a method for selecting information units which have the features detailed in claims 1, 9 and 15.

Hence, in the method according to the invention the selection of information units for mobile client computers is effected by assigning geographical locational information to  
15 each of the individual information units and by making allowance for this locational information and the geographical position of the client computer in making the selection.

In this way it becomes possible to restrict the selection of information units to those units which relate to a given  
20 geographical area. In particular, information units which are situated close to the position of the client computer can be selected.

A major advantage of the method according to the invention is that the selection of information units is restricted to a  
25 preset geographical area and in this way a large number of irrelevant items of information are got rid of. This also reduces the computer cost and complication required for processing, transmitting and presenting the information.

In a variant of the invention the client computer is  
30 situated in a means of transport such as a train, aircraft or motor car.

In another variant of the invention the position of the client computer which is allowed for does not necessarily have



to be its current position but can be a past or an expected future position of the client computer or the means of transport.

In a further variant of the invention the information units  
5 are image files which are generated by so-called web cameras or "webcams" and are continually updated.

Other preferred embodiments can be seen from the dependent claims.

#### 10 Brief description of the drawings

The invention is explained in detail below by reference to a preferred embodiment which is shown in the accompanying drawings. In the drawings:

15 Fig.1 is a schematic representation of communications links and elements which the method according to the invention uses,

Fig.2 is a representation of information units which are selected in a variant of the invention, and

Fig.3 shows a section of a Voronoi diagram.

20 The reference numerals used in the drawings and their meanings are listed as a group in the list of reference numerals. The same elements are always given the same reference numerals in the drawings.

#### 25 Ways of implementing the invention

Fig.1 is a schematic representation of elements and links which the method according to the invention preferably uses. The links should be thought of as bi-directional communications  
30 links. In Fig.1, a plurality of sources of information, i.e. sources 2 of information units, one or more server computers, referred to for short as servers 3, and one or more client computers, referred to for short as clients 4, are connected

together by means of a communications network 1. A client 4 has a processing unit, a display unit and a communications unit for communicating with the communications network 1. A client 4 preferably also has means for determining its geographical position and means for the input of information by a user. One or more first clients 4 are connected to the communications network 1 via a standard interface 5 belonging to the communications network 1. One or more second clients 4' are connected via a special interface 6 to a coupling unit 7 which is connected in turn to the communications network 1. One or more third clients 4'' do not communicate via the communications network 1 but via special interfaces 6 with the server 3. Other, fourth clients 4''' are connected to a shared proxy server 8 on a means of transport 9, which in turn is connected to the communications network.

There are various technological variants that can be employed to implement the above-mentioned elements of the invention. The communications network 1 may for example be the internet, which is based on the TCP/IP protocol, or the world-wide web which is based on the internet. The sources 2 may for example be files in the HTML format or a format derived therefrom, or image files, which can be accessed by means of the communications network 1. The clients 4 are portable, being for example a PDA (personal digital assistant) or a mobile phone with an integral web browser, or are fitted in a means of transport such as a motor car, train, bicycle, aircraft, airship, boat or submarine. Browser software used by the client 4 is fully HTML-compatible or else is tailored to efficiently display image or textual information. The standard interface 5 is preferably a TCP/IP (Transmission Control Protocol/Internet Protocol) link. It can for example be implemented in transparent form by means of a telephone network or a wireless transmission facility. The special interface 6 is for example a private

communications network or a non-standardised communications protocol or a proprietary interface.

Two advantageous variant implementations of the invention are described below. What is common to both variants is that the server 3 collects information from a plurality of sources 2 and assigns geographical locational information to each source 2. This assignment is performed by, for example, extracting geographical locational information which is already explicitly present in a source or implicitly present in a text at the source, by analysing an IP address associated with source, or by manual input by a user.

A proposal for how information units which are made available over the internet can be provided with explicit information on a geographical location is made in the "w3c Proposed Recommendation 03, March 1999" under the title "Resource Description Framework (RDF) Schema Specification" by Dan Brickley and R.V.Guha, which can be found at <http://www.w3.org/TR/PR-rdf-schema>.

In a first advantageous variant of the invention, the invention is used for informing and entertaining passengers on a means of public transport such as the railway, a bus or coach or an aircraft. In this case the passengers are shown images by means of the display unit of the client 4, the images making reference to the route followed by the means of transport. These images are for example generated and continually updated by so-called web cameras or "webcams" acting as sources 2. For this purpose, the client 4 makes contact periodically with the server 3 and transmits to the server 3 an enquiry and a past, current or future position of the means of transport. The position, i.e. the geographical location, of the means of transport is found by means of a GPS (global positioning system) receiver for example. In the case of a railway vehicle, signalling and route data can also be used to determine position and in the case of an

aircraft appropriate navigational data can also be used for this purpose.

A first form of the enquiry asks about a web camera which is closest to the position of the means of transport. The server  
5 3 then either transmits to the client 4 a reference or an address, such as a URL (uniform resource locator) address, of a web camera, whereupon the client 4 loads the image data from the web camera, or the server itself loads the image data from the web camera and transmits it to the client 4. In both cases it is  
10 advantageous if the server checks whether the image data has changed since the last enquiry, thus making it unnecessary for data to be transmitted to the client 4. Periodic enquiries show either new images from the same web camera or images from a different web camera if the means of transport is approaching  
15 the latter. This first form of enquiry is advantageous if a plurality of, or all, the passengers view the images displayed by a client 4. The image data comprises not only the image information proper but also data such as parameters of the image, time of recording or comments.

20 A second form of enquiry asks for all the web cameras which are situated in a preferably rectangular section of the area surrounding the position of the means of transport. This section is for example defined by the geographical latitude and longitude of its centre and by the width and height of the  
25 section, in kilometres for example. The server 3 then transmits to the client 4 as references for the sources 2 the addresses of all the web cameras which are situated in this section together with their geographical location, i.e. their geographical latitude and longitude for example, and reduced or thumbnail  
30 images 22 from the relevant web cameras. The client 4 superimposes these reduced images on a map 21 of the surrounding area and shows the resulting image on the display unit of the client 4. An example of a representation of this kind is shown

in Fig.2. The reduced images 22 are advantageously hyperlinks, i.e. they have a reference assigned to them. The reference is for example the address of a web camera. From this representation the user selects which image he would like to see  
5 enlarged. He makes the selection by for example clicking on a reduced image 22 with a graphic input unit or by touching a touch-sensitive surface of the display unit. The image selected is loaded by the client 4 from the web camera, or the server 3 loads the image data from the web camera and transmits it to the  
10 client 4. This second form of enquiry is advantageous if for example each client 4 is assigned to an individual passenger. Advantageously, the means of transport is fitted with a proxy server 8. This stores the replies to all the enquiries from all the clients 4 in a circulating memory so that images and  
15 addresses which are asked for by a plurality of passengers are transmitted to the means of transport only once.

By compressing the image data and if the transmission interfaces 5 and 6 have sufficient bandwidth available, it is also possible for video images to be shown rather than stills.

20 The server 3 maintains data structures which allow the enquiries from the clients 4 to be answered efficiently:

To determine the position of the web camera closest to the means of transport when the enquiry is of the first form, use is made of Voronoi diagrams for example. Fig.3 shows a section of a  
25 two-dimensional Voronoi diagram. In a two-dimensional Voronoi diagram, a plane which contains a set of given points 31 is partitioned into a set of regions 32 in such a way that the distance between any point in a region and one of the given points 31 is less than the distance to any of the other given  
30 points 31. In the present invention, the positions of web cameras constitute the given points 31. It is found from the position of a client 4 in which region the client 4 is situated and hence which is the closest web camera.

The use of a Voronoi diagram typically entails the use of a corresponding data structure for searching. The latter is generally an acyclic directed graph with a height of the order of  $O(\log n)$  where  $n$  is the size of the Voronoi diagram, i.e. the number of given points in it, and the maximum number of branches radiating from each node in the graph is constant. It is thus possible in logarithmic time to find the associated region in the Voronoi diagram for a point  $(x,y)$  and hence the closest of the given points. The search structure is typically also used to add new points or to remove points. Both cause changes to the Voronoi diagram and the search structure but the cost involved is less than would be entailed by re-determining them in their entirety.

To determine all the points which are situated in a given rectangular section of a plane for the second form of the enquiry, two-dimensional range trees (referred to below as RT's) for example are used. An RT for two-dimensional positional co-ordinates  $(x,y)$  has an RT for a first co-ordinate  $(x)$ , with each node in the RT which is not a leaf having an RT with a second co-ordinate  $(y)$  for all the points in the subtree of the node. A two-dimensional RT for a set of points in the Euclidean plane is a data structure which efficiently supports window enquiries. A window enquiry means the listing of the points which are situated in a given rectangular section of the plane whose outlines are parallel to the axes of the plane. Efficient means a polylogarithmic cost, i.e. a cost of the order of  $O((\log n)^c)$  where  $n$  is the number of points and  $c$  is a constant. RT's are implemented as static, semi-dynamic or dynamic structures. In the case of static structures all the points are known before the structure is calculated. In the case of semi-dynamic structures points can be added efficiently and in the case of dynamic structures points can be added and removed efficiently.

The data structures, i.e. the Voronoi diagram or two-dimensional RT, are continually updated by accepting new web cameras that become available and cutting out ones that cease to be available, thus ensuring optimum availability of the data on offer. Since the number n of web cameras may be considerable, these operations need to be efficiently performed, at polylogarithmic cost for example.

The process of finding web cameras from the large and constantly changing number of URL's may for example be automated by examining the environment of images which are included in web pages for keywords such as "webcam" or "camera" and by examining images for periodic changes. This process produces a set of web cameras of potential interest. When web cameras are accepted into the data structures of the server 3, either the geographical locational information is determined from data which the web camera or the computer managing the web camera itself explicitly supplies or it is added by an operator. Such an operator also checks the quality of the contents of the images from a given web camera.

Compared with conventional displays in aircraft or railway vehicles, this first variant of the invention gives a substantially higher standard of information or entertainment. In comparison with totally random internet enquiries by the passengers, the load on the communications interface between the means of transport 9 and the communications network 1 is far smaller.

In a second advantageous variant of the invention, the invention is used to supply information to occupants of a motor car or to users of a portable client 4. In this case information relating to the position of the means of transport and to a user-defined category is presented to the user or users by means of a display unit belonging to the client 4. By means of the

facility according to the invention the user may for example determine what the nearest pizzeria is.

For this purpose the method according to the invention operates as follows: the server 3 transmits to the client 4 a set of categories in which a mobile user may be interested. These categories designate for example facilities such as restaurants, car parks, bus stops, cinemas, events, police stations or public conveniences. The client 4 shows these categories on its display unit, whereupon the user selects a category of interest by means of an input device. The transmission, representation and selection of categories are preferably performed by a user defining his interest by making selections from a question tree containing questions that become successively more specific. In this case the server determines what is selected next in each case from the answer by the user which is transmitted from the client 4. The client 4 also transmits information on the geographical position or location of the client 4. The position is for example determined by means of a GPS (global positioning system) receiver fitted in the client 4.

A category of interest having been selected as described above, the server looks for appropriate facilities which are situated in physical proximity to the client 4. For this purpose the server 3 finds for example the closest facility, a preset number of facilities which are closest or the set of facilities which are within a preset distance from the client 4. For this purpose the server 3 maintains a database on facilities which also contains information on the geographical location of the facilities. A dataset in this database may for example have for each facility geographical locational information, a brief description or keywords for the facility, and a reference for further information on the facility. The reference is advantageously a network address and in particular a URL. The



database is generated automatically, partly manually, or solely manually by reference to web pages and other information on the facilities. As long as web pages do not contain geographical locational information as standard, a proportion of manual work  
5 will be necessary. It will be done by a specialist information service and will be financed by the facilities affected and/or by charging for user enquiries.

The server 3 transmits brief descriptions of the one or more facilities found to the client 4, together advantageously  
10 with hyperlinks by means of which the client 4 can call up information on facilities which have been found directly. Information of this kind may relate for example to prices, timetables, programmes, menus, wine lists, seats available or the standard of the facility. In another variant of the  
15 invention, criteria relating to this information are preset by the user and are allowed for even at the stage when facilities are being searched for. In a search for restaurants, the user may for example preset the criterion that a table for ten people has to be free. If a restaurant able to provide this is found,  
20 the table is reserved via the restaurant's web site and the wine for example is put to cool. If the user wishes, the server 3 transmits to the client 4 a plan of the area surrounding the client 4 on which the restaurant is entered.

List of reference numerals

- 1 Communications network nw
- 2 Source of information units src
- 3 Server srv
- 5 4, 4', 4'', 4''' Client computers cl
- 5 Standard interface with communications network
- 6 Special interface
- 7 Coupling unit cu
- 8 Proxy server ps
- 10 9 Means of transport
- 10 Map
- 22 Reduced image
- 31 Given point
- 32 Region

## CLAIMS

1. Facility for selecting information units for a mobile  
5 client computer (4), comprising a server computer (3) having  
means for selecting information units by preset criteria,  
characterised in that

the preset criteria have geographical locational  
information,

10 each information unit has geographical locational  
information assigned to it, and

this locational information and a geographical  
position for the client computer (4) are input variables for the  
selecting means.

15 2. Facility according to claim 1, characterised in that  
the server computer (3) has data structures for supporting a  
selection made from among preset points on a plane which are  
situated closest to a further preset point.

3. Facility according to claim 2, characterised in that  
20 the data structure maps a Voronoi diagram.

4. Facility according to claim 2, characterised in that  
the data structure maps a two-dimensional range tree.

5. Facility according to claim 1, characterised in that  
the information units contain essentially images from web  
25 cameras.

6. Facility according to claim 1, characterised in that  
the information units can be transmitted to a client computer  
(4) and contain instructions for showing the information units  
on a display unit belonging to the client computer (4).

30 7. Facility according to claim 1, characterised in that  
the position used for the client computer (4) is a current,  
past, or expected future position of the client computer (4).

8. Facility according to claim 1, characterised in that the information units have references to sources of information (2).

9. Computer system for selecting information units for mobile client computers (4), comprising a server computer (3) having means for selecting information units by preset criteria, and a client computer (4), characterised in that

the preset criteria have geographical locational information,

each information unit has geographical locational information assigned to it, and

this locational information and a position for the client computer (4) can be used for the selection.

10. Computer system according to claim 9, characterised in that the client computer (4) has means for determining its geographical location.

11. Computer system according to claim 9, characterised in that the client computer (4) is fitted in a means of transport (9).

12. Computer system according to claim 11, characterised in that the means of transport (9) is a train, aircraft, motor car, boat, bicycle, airship, submarine or spacecraft.

13. Computer system according to claim 9, characterised in that the means of transport (9) has a proxy computer (8).

14. Computer system according to claim 9, characterised in that the server computer (3) and the client computer (4) are connected together via a communications network (1), the client computer (4) preferably having a wireless communications link to the communications network (1).

15. Method of selecting information units for mobile client computers (4), characterised in that each information unit has assigned to it geographical locational information and

this geographical locational information and a position for the client computer (4) are used for the selection.

16. Method according to claim 15, characterised in that the position used for the client computer (4) is a current, past, or expected future position of the client computer (4).

17. Method according to claim 15, characterised in that the geographical locational information of each information unit assigns to said information unit a physical position, and the selection determines a preset number of information units whose assigned position is closest to the position of the client computer (4).

18. Method according to claim 15, characterised in that the geographical locational information of each information unit assigns to said information unit a physical position, and the selection determines those information units whose assigned positions are in an area surrounding the position of the client computer (4).

19. Method according to claim 15, characterised in that the server computer (3) determines categories of interest by interaction with a user, and restricts the selection to information units which belong to said categories of interest.

20. Method according to claim 15, characterised in that the server computer (3) transmits results of the selection to the client computer (4) and the client computer (4) shows the results on a display unit belonging to the client computer (4).

21. Method according to claim 15, characterised in that the information units contain image data which is generated by so-called web cameras or "webcams".

## ABSTRACT

A facility, a computer system and a method for selecting information units for mobile client computers (4) operate by assigning geographical locational information to each of individual information units, and this locational information and a position for the client computer (4) are used for the selection. This makes it possible for the selection of information units to be restricted to information units which relate to a given geographical area. In particular, it is possible for information units which are situated close to the position of the client computer (4) to be selected. In a preferred variant of the invention, images from web cameras which are situated close to a means of transport are shown in the means of transport. In a further variant of the invention, what are determined are facilities falling into a preset category, such as restaurants, car parks, bus-stops or cinemas, which are situated in the vicinity of a mobile client computer (4).

(Fig.1)

1/2

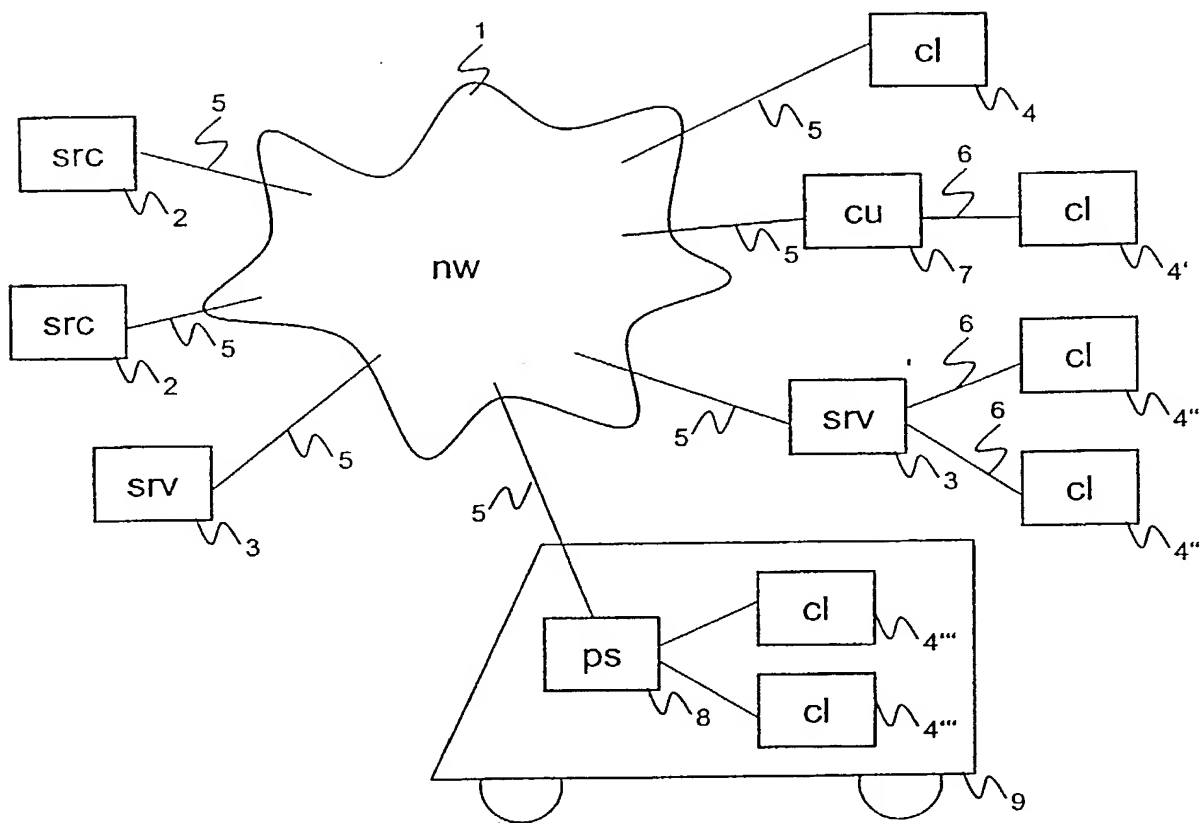


Fig. 1

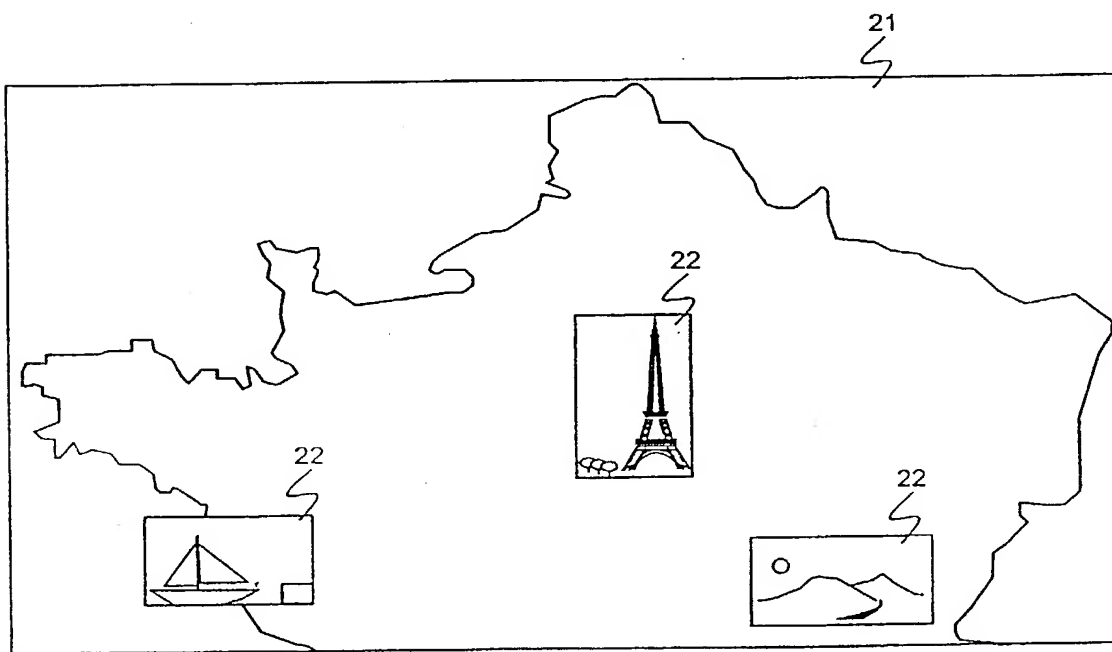


Fig. 2

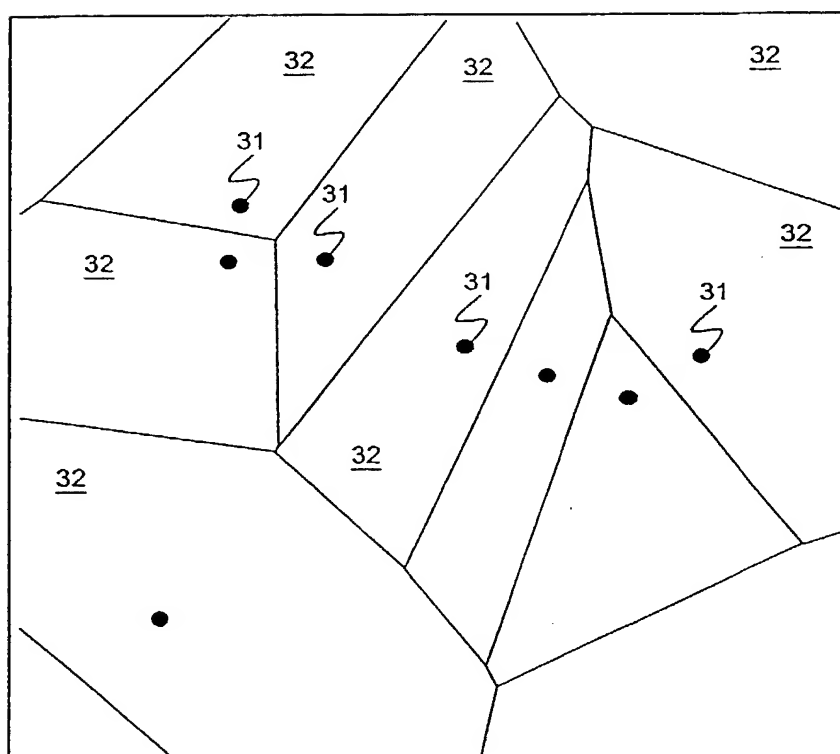


Fig. 3



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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### SELECTION OF INFORMATION FOR MOBILE CLIENT COMPUTERS

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as United States Application Number or PCT International Application Number: 10/009,484

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(Number)	(Country)	(Filing Date: day/month/year)	Priority Not Claimed
(Nummer)	(Land)	(Anmeldetag : tag/monat/jahr)	Priorität nicht beansprucht
PCT/CH00/003	International Application	9 <sup>th</sup> June 2000	<input type="checkbox"/>
			<input type="checkbox"/>

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